

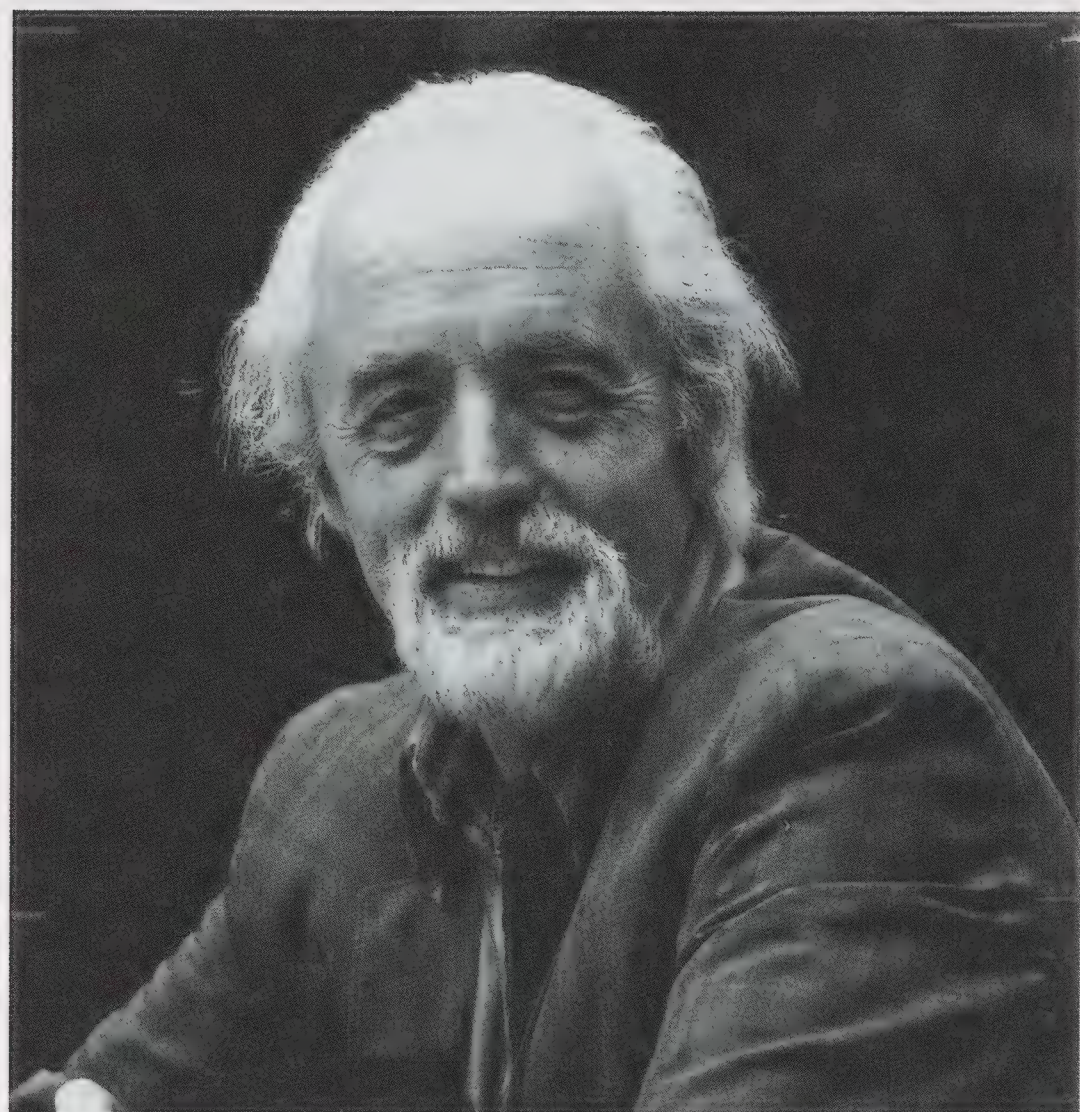
IN MEMORIAM

ARTHUR RICE KRUCKEBERG: GEOBOTANIST EXTRAORDINAIRE (1920–2016)

Art Kruckeberg passed away on May 25, 2016 at the distinguished age of 96. In his passing, the botanical community lost a passionate botanist, a skilled teacher, an avid gardener, and a dedicated conservationist. Art taught botany, biology, plant evolution, and a course in ornamental plants at the University of Washington, Seattle from 1950 to 1989 and served as the Chair of Botany there from 1971 to 1977. Art was author of numerous peer-reviewed publications in botany (30 publications counted on Web of Science; Thomas Reuters, New York, accessed July 6, 2016), many of which focused on the systematics, ecology, and evolution of serpentine plants, including three in *Madroño* in 1958 (14: 217–227), 1983 (30: 230–244), and 1995 (42: 458–469). He also wrote books on geobotany (1984, 2002, 2006), natural history (1991), and gardening (1982). Art was one of the founders and past presidents of the Washington Native Plant Society and a co-editor of its journal *Douglasia* for many years. Sarah Gage, who wrote an appreciation in celebration of Art's 80th birthday in 2000 (*Douglasia* 24 [3–4]: 5–10), remembers Art as “a grand old man of Washington botany, a mentor, and a mensch.” Art was a giant in western North American botany, a dedicated teacher, a willing mentor, a rigorous scholar, and a devoted friend of native and ornamental plants. For much of his life, Art worked passionately and painstakingly to preserve natural habitat and to create a home for plants in his own backyard.

Art was dedicated to the field of serpentine ecology and was one of its most committed disciples since the mid-1940s. Art's pioneering efforts to use experimental approaches for understanding plant evolution on serpentine soils were fundamental to promoting serpentine plants as model systems for studies in evolutionary ecology. He was a teacher, a friend, and a mentor to many generations of serpentine ecologists from across the world. Art was a revered celebrity in the international serpentine ecology community, a close-knit family of over 150 researchers, including botanists, geologists, and soil scientists, from approximately 45 nations. Those of us who had the good fortune to botanize on serpentine outcrops with Art will always remember him for the infectious fascination with which he talked about serpentine plants, whether they were ones he had encountered often or those that were new finds. Art, the supreme “Dr. Serpentine,” will be sorely missed by serpentine enthusiasts, his colleagues, and friends for years to come.

Art grew up in South Pasadena, CA, where he fell in love with plants at a young age. He pursued his passion for plants at Occidental College, where he received a B.A. in Botany in 1941. The summer after his graduation, Art began working as an assistant for the renowned evolutionary botanists Jens Clausen, David Keck, and William Hiesey at the Carnegie Institution of Washington's Depart-



Art Kruckeberg as Chair, Department of Botany, University of Washington, Seattle. Courtesy Kruckeberg Botanic Garden Foundation

ment of Plant Biology at Stanford University (he began his graduate studies there shortly afterwards). However, his graduate tenure was cut short due to the Second World War, when he was enlisted as a Japanese language expert for the US Navy. While Clausen, Keck, and Hiesey went on to publish some of the most-cited works on experimental approaches to understanding the genetic structure of plant populations and adaptive evolution (see Núñez-Farfán and Schlichting 2001, *Quarterly Review of Biology* 76: 433–457), Art spent the war years translating Japanese documents. In 1946, Art entered the University of California, Berkeley where he earned a Ph.D. in Botany in 1950. Art's dissertation, “*An Experimental Inquiry into the Nature of Endemism on Serpentine Soils*,” had all the hallmarks of the early training he received from Clausen, Keck, and Hiesey; however, his focus on serpentine plants was clearly influenced by his graduate committee, consisting of Herbert Mason (phytogeographer), Hans Jenny (soil scientist), and G. Ledyard Stebbins, Jr. (evolutionary botanist and co-contributor to the modern synthesis). Mason had published two seminal papers on edaphic endemism in 1946 (*Madroño* 8: 209–216; 241–257) and encouraged Art to study the nature of plant endemism on serpentine soils. Art's first publication in 1951 (*American Journal of Botany* 38: 408–419), titled “*Intraspecific variability in the response of certain native plant species to serpentine soil*,” is one of the most influential papers on ecotypic differentiation in serpentine-



Author botanizing on a serpentine outcrop in Cuba with Art Kruckeberg during the mid-conference tour of the Fourth International Conference on Serpentine Ecology (2003). Photo Credit: Micheal Davis

tolerant plants, highlighting the use of common garden and reciprocal transplant approaches to understanding the evolutionary process. This paper, along with his 1954 paper titled “*The ecology of serpentine soils. III. Plant species in relation to serpentine soils*” (*Ecology* 35: 267–274), were critical in demonstrating the role of serpentine soils as selective agents in plant evolution. For a review of how Art’s early research shaped the study of edaphic factors as stimuli for plant evolution, particularly the origin of serpentine-endemic taxa, see the article by Brian Anacker (2014, *American Journal of Botany* 101: 219–224).

While I did not have any formal associations with Art, my serpentine journey began with exposure to his writing early in my undergraduate years at College of the Atlantic (COA). In 1991, as a sophomore at COA, I took a course in plant systematics with the late botanist Craig Greene. During his lecture on plant endemism, Craig brought up serpentine-endemic plants of western North America, citing Art’s work on ecotypic differentiation. At the end of the class, I wanted to know more about serpentine plants. Craig

gave me two photocopied papers (both of which I still proudly own): “*Soil diversity and the distribution of plants, with examples from western North America*” (1969, *Madroño* 20: 129–154) and “*An essay: The stimulus of unusual geologies for plant speciation*” (1986, *Systematic Botany* 11: 455–463). These eloquent papers implanted in me a deep desire to see serpentine plants of western North America and to think about the study of plant evolution under the serpentine influence as a fruitful area for graduate study. In Art’s own words, “the serpentine bug had bitten me” even before I had seen a serpentine outcrop or a serpentine-endemic plant. This newfound fascination took me to the Department of Botany at the University of British Columbia, in 1995, where I pursued my M.Sc. under the supervision of Bruce Bohm. Soon after I published my first paper on edaphic differentiation in the *Lasthenia californica* (Asteraceae) complex (1999, *American Journal of Botany* 86: 1576–1596), I received a letter in the mail from none other than Art Kruckeberg. In his letter, Art congratulated me on a “fine-piece of work” and said, “more work should be done looking at how edaphic heterogeneity within serpentine outcrops contributes to plant distributions and ecotypic differentiation.” This was my first personal interaction with Art, and getting his stamp of approval and nudge for additional work was the impetus I needed during a time when I was deciding whether to continue with a Ph.D. or return to my homeland, Sri Lanka. I was deeply touched by how someone of his stature could take the time to write to a novice and a stranger like myself, and replied immediately, thanking him profusely. A few months later, upon his invitation, I visited Art in his office at the University of Washington. Upon asking for directions to his office, I was told to “follow the smell of the tobacco and the sounds of the typewriter, Art will be behind those doors.” I quickly realized how precise these odd directions were. Knocking on his door I heard “enter” in a deep and commanding voice. Meeting Art for the first time was truly a humbling experience. He looked quite the distinguished gentleman, spectacled and neatly dressed (with suspenders, of course), a lighted pipe in his hand, and an old typewriter at his desk; there was a freshly typed page still dangling on the side of the machine and Art still deep in thought. After saying hello, he asked how I came to be called “Nishi.” When I explained to him that I had spent my early years in Japan, he smiled and said, “Aha, I knew that” (Nishi means west in Japanese). We talked about our shared experiences of a foreign land, decades apart. He then inquired about Sri Lanka and whether the civil war had made me flee the island; when I said yes, he wanted to know more. Twenty minutes into the meeting, we were still chatting about foreign lands, languages, ethnic conflicts, and food when he looked straight at me and said “would you like to be a teaching assistant for a geobotany course I am co-teaching with Robert ‘Bob’ Coleman [eminent Stanford geologist and fellow serpentine enthusiast]?” I was stunned but said yes. That summer I was off to the Siskiyou Field Institute in Cave Junction, OR, to assist in teaching a course about the geobotany of a place I knew nothing about! That was how Art came into my life; he sensed my drive to learn and my fascination with a system he, too, had fallen in love with and he did what he could to help me realize my dream. Art was

generous with his time and I learned much during my two weeks with him and Bob. In return, I was the designated driver for Art when he wanted to explore the nearby vineyards for the tasting of southern Oregon wine. This gave me the great pleasure of chatting away with Art about plants and soils and about his family and life while he enjoyed the many flavors of Oregon grapes. Art had a way with people; he was generous with his time and expertise, and he was always gracious in his interactions with those young and old, amateur and professional. He was always ready to give and encourage those who needed some words of wisdom or a letter of recommendation.

Susan Harrison, plant ecologist and fellow serpentino-phile from the University of California, Davis, fondly remembered Art for his graciousness, sincerity, and optimism:

“In 2001, Art gave a seminar at Davis and we took a field trip to explore the serpentines at McLaughlin Reserve. He drew an incredible turnout: a full house of 100+ and 25 to 30 for the field trip. His talk was wonderful, full of the kinds of details that Art is legendary for (the names of plants he saw at specific locations on a field trip 40 years ago, etc.). Our community was really enchanted by the chance to see a living legend from the golden era of the modern synthesis. Art’s tremendous graciousness manifested when I arrived late at the train station to find him peacefully sitting on a bench in a light rain, and also when the field trip turned out to be cold and wet and our hike a little rougher than expected. He just seemed to tolerate every little adversity with such a greatness of spirit, and was always ready to turn the conversation to a more pleasant topic. I also remember that when some of us were bantering in our slightly cynical everyday fashion, he didn’t participate, and later made a mild comment about our ‘fin-de-siècle’ attitude. That stuck with me because it exemplified what a Greatest Generation member he was—so full of sincerity and optimism, so lacking in negativity and self-indulgence.”

Robert Boyd, another plant ecologist and fellow serpentino-phile from Auburn University, warmly recalled Art’s energy and enthusiasm for all things geobotanical:

“In the early 2000s, I invited Art to come give a talk to my department [Biological Sciences]. Art was interested in going to the field while he was here, and my Ph.D. student at the time, Mincy Moffett (now a botanist for the Georgia Department of Natural Resources), and I took him to the famous Bibb Glades here in Alabama. These are places where the soils are derived from Ketona Dolomite, an unusually pure type of limestone. The rocky, open sites (surrounded by hardwood forest) host at least eight endemic plant taxa; the endemic plants and their community were only discovered in 1992! Given Art’s abiding interest in geobotany, these were the perfect places to take him to show him unusual soils and endemic plants. With the able aid of Al Schotz, botanist for the Alabama Natural Heritage Program, we showed Art some of these interesting sites and some of the endemic plants. Art also expressed interest in seeing *Neviusia*

alabamensis (Rosaceae), which grows on limestone here in Alabama, because Art had a specimen in his garden of *N. cliftonii* collected from limestone in northern California (it is endemic to Shasta County and was discovered in the early 1990s). These are the only two species in the genus and they are disjunct by over 1,000 miles. Much to Art’s delight, Al and Mincy managed to guide us to a spot where *N. alabamensis* was found, and Mincy later was able to obtain a living specimen, which he sent to Art. Years later Art reported that the specimen was alive and well in his garden, a memento of his visit to Alabama.”

Alan Baker, co-founder of the International Conferences on Serpentine Ecology, and formerly of Sheffield and Melbourne universities, recalled the pleasure he always had talking to Art and seeing Art’s great interest and enthusiasm in helping others:

“A real gentleman to be sure; one of the Titans of the geobotanical world. I vividly recall my first field visit to the Californian serpentines with Art and the late Joe Callizo of the California Native Plant Society as leaders on the mid-conference trip from UC Davis. His intimate knowledge of the very rich flora truly amazed me. Tony Bradshaw (my guru) also held Art in great esteem.”

Roger Reeves, the other co-founder of the International Conferences on Serpentine Ecology, and formerly of Massey University, remembers Art’s love for and relationship with serpentine:

“One of Art’s long-held ambitions was to visit Dun Mountain near Nelson, New Zealand, one of the country’s small number of ultramafic sites. The name was given by early settlers for its dun color, and when Austrian geologist Ferdinand von Hochstetter in 1859 discovered that its characteristic rocks were composed of olivine with small amounts of chromite, he named the rock dunite, and this became its type locality. As is often the case elsewhere, a well-defined vegetation change occurs at the sedimentary-ultramafic boundary, and several plant species are endemic to Dun Mountain. In November 1984, I accompanied Art to Dun Mountain. After a long walk through the forest we emerged suddenly onto the sparsely vegetated ultramafics. Art dropped to his knees and bowed his head in a sign of veneration to this historic site.”

The International Conferences on Serpentine Ecology, held every 3–4 years since 1991, are venues where stories of Art are often reminisced and shared. The first conference was held at the University of California, Davis and was intended as a means of recognizing the life-long contributions to serpentine ecology by Art and two other leaders in the field, Robert Brooks and Ornella Vergnano Gambi. Presentations were made to each of the three honorees at the banquet dinner. The late Richard Walker, Art’s long-time colleague at the University of Washington and fellow serpentino-phile, commenting on Art’s “way of living and working” in the conference proceedings, states:

“[Art] is gregarious, devoted to family and friends, an effective and sought after leader of field excursions and discussion groups, always ready to help others, and a wise

counsellor. He maintains an active correspondence with colleagues over the world, but in his own work and writing, he is an individualist, doing his plant trials by himself, making his own evaluations of results, formulating his own essays, and rarely collaborating with others. His greatest delights are in relaxation and reading (voracious and wide-ranging) and in growing plants. . . . We are all fortunate to have been influenced by this versatile serpentinophile.”

Art attended three of the eight International Conferences on Serpentine Ecology: Davis, CA (1991), New Caledonia (1995), and Cuba (2003). I attended the conference in Cuba with Art and was thrilled to see him in action in the vast and diverse serpentine landscapes across the island. Art was fascinated with new plants he was encountering; I will always remember his almost child-like admiration of his “first encounters” and his willingness to learn from and share his knowledge with the locals. I also remember watching Art during conference presentations. Art would often doze off halfway through a talk but would wake up as soon as the presentation is over and raise his hand to ask one of the most probing questions of the talk. I, along with many other young researchers at the time, were always amazed at how he could ask such critical questions despite sleeping through much of the talk.

Art’s other botanical- and conservation-oriented accomplishments included serving on the Editorial Board of *Madrôño* and the advisory councils of the Washington Natural Heritage Program and the Center for Plant

Conservation. During his long teaching career, he took great interest in undergraduate students and supervised numerous M.Sc. and Ph.D. students. Art and his wife, Mareen, shared a deep love for and admiration of plants, and together they shaped their four-acre property into a beautiful garden of native and ornamental plants. Their legacy will live on in the form of the Kruckeberg Botanic Garden and the MsK Rare and Native Plant Nursery, a public/private cooperation between the City of Shoreline and the Kruckeberg Botanic Garden Foundation. In recognition of Art’s life-long efforts to promote botany, he was awarded the prestigious Peter Raven Award for public outreach in botany by the American Society of Plant Taxonomists in 2006.

In 2000, I had the great pleasure of writing in celebration of Art’s 80th Birthday (see Botanical Electronic News Issues 244–246 for several articles by Art’s former students and colleagues, including the late Richard Walker, Robert Coleman, and Rhoda Love; <http://www.ou.edu/cas/botany-micro/ben/2000.shtml>) and, now, I write with a deep sense of appreciation for having had the good fortune of knowing Art as a scholar, mentor, and friend. Art’s life and work will be celebrated by the attendees of the 9th International Conference on Serpentine Ecology in Tirana, Albania, in June 2017.

Dr. Serpentine, you rock!

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